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Original Study

Effects of Mild Cognitive Impairment on the Development of Fear of Falling in Older Adults: A Prospective Cohort Study

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A B S T R A C T

Objectives: The aim of this study was to determine whether mild cognitive impairment (MCI) affects the development of fear of falling (FoF) in older adults.
Design: Prospective cohort study.
Setting: The Obu Study for Health Promotion in the Elderly, Japan.
Participants: A total of 1700 community-dwelling people aged 65 years or older without FoF at baseline participated.
Measurements: FoF and related variables, such as physical function, self-rated health, depression, and total number of medication doses, were investigated at baseline. Participants also underwent cognitive tests and were divided into cognitive healthy and MCI. Fifteen months after the baseline measurements, we collected information about the status of FoF and fall incidence during the 15-month follow-up.
Results: At the 15-month follow-up survey, 452 participants (26.5%) reported the development of FoF. Logistic regression analysis showed that MCI (odds ratio [95% CI] = 1.41 [1.07–1.87]) and a fall incident (3.00 [2.23–4.07]) during follow-up independently predicted the development of FoF, after controlling for demographic factors, physical function, self-rated health, and depression. The odds ratio for the development of FoF in participants with both MCI and a fall incident compared with those without them was 7.34 (4.06–13.3), after controlling for confounding factors.
Conclusion: MCI predicts the new onset of FoF in older adults, especially when they have experience with falling. Aside from the risk of falling, it is suggested that individuals with MCI are an at-risk population for FoF and related negative consequences in terms of postfall syndrome.

Fear of falling (FoF) has been identified as a common and potentially disabling problem in community-dwelling older adults. Approximately half of the community-living older population experiences FoF,[1,2] and approximately one-third of older adults who had been free from the symptom developed FoF during a year.[3] Negative consequences and a debilitating spiral of FoF have been widely documented, such as an increased risk for falling, restriction and avoidance of activities, deteriorated physical and mental performance, and ultimately, loss of independence as well as decreased quality of life.[4–6] It is reported that FoF may be as harmful psychologically as falling itself.[7] Factors reported to be independently associated with FoF include older age, female gender, previous falls, decreased physical function or mobility, use of walking aids, poorer self-rated health, depression, and living alone.[1,4] Despite a number of reports regarding various factors associated with FoF, few studies have examined the relationship between FoF and cognitive decline, which is strongly related to the risk of falling.

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Emerging evidence indicates that cognitive impairment is a risk factor for falls, that is, dementia and even mild cognitive impairment (MCI).[8,9] MCI is conceptualized to be the earliest feature of cognitive disorders and a prodromal condition between normal cognitive functioning and dementia.[10] Neuropsychiatric symptoms are also common in MCI and are reported to occur in 35% to 75% of cases.[11,12] Anxiety, depression, and irritability are the most common symptoms.[12,13] In particular, anxiety is a clinical predictor of early conversion to Alzheimer disease (AD).[14] If individuals with MCI are also excessively anxious about falling and related injuries, they may be prone to developing FoF, especially when having a fall experience, compared with individuals with normal cognition. However, it remains unclear whether MCI contributes to the development of FoF. If there is a neuropsychiatric symptom associated with falling in MCI, we hypothesized that MCI and fall incidents synergistically affect the development of FoF.

In addition to studying the risk of falling, investigation of FoF may be important in the medical management of older adults with MCI. Because of a lack of studies that allow conclusions regarding causality in the research field of FoF, little evidence is available on what causes this fear.[15] We have previously reported that individuals with MCI had higher FoF prevalence than cognitive healthy individuals,[2] but causality has not been clarified. The purpose of the present study was to elaborate the influence of MCI on the new onset of FoF, especially focusing on the interaction with fall incidents, in a longitudinal study design.

Methods

Participants

The current prospective cohort study involved community-dwelling older adults who were enrolled in a cohort study called "Obu Study of Health Promotion for the Elderly" (OSHPE) from August 2011 to February 2012. Figure 1 shows the flowchart of participant recruitment and screening. Inclusion criteria required that the participant was aged 65 years or older at examination in 2011 or 2012, lived in Obu, had not participated in another study, and had not been certified as needing support or care by the Japanese public long-term care insurance system (Care Level ≥3/5). Recruitment was conducted through letters mailed to 14,313 people, and 5104 people underwent a baseline assessment including a face-to-face interview and measures of physical and cognitive function. A follow-up postal survey was carried out at approximately 15 months after the baseline assessment (November 2012–May 2013) with an offer of assistance in completion. In this prospective study, we included participants who completed baseline assessments of physical performance and cognitive function and follow-up assessments of fall incidents and FoF. We excluded participants with a history of AD, disability in basic activities of daily living, or Mini-Mental State Examination (MMSE) scores of 23 or lower in this study. We also excluded participants who had FoF at baseline so as to focus on the new onset of FoF. Finally, as 3175 were excluded at baseline and 229 did not complete the follow-up survey, this prospective cohort study analyzed data from 1700 older adults. The mean age of the participants was 70.8 (±4.7) years, and 62.1% were men. Informed consent was obtained from all participants before their inclusion in the study, and the Ethics Committee of the National Center for Gerontology and Geriatrics approved the study protocol.

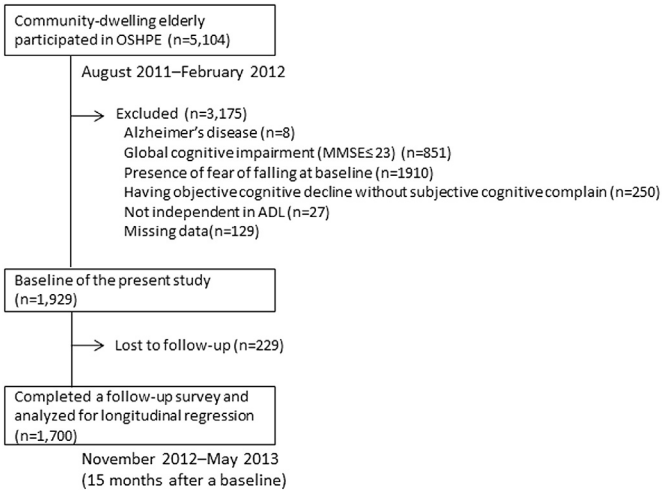

Fig. 1. Flowchart of participant recruitment and screening.

Classification of Cognitive Status

The criteria of MCI were those described by Petersen.[16] These criteria involved the following: (1) having subjective memory complaints, (2) having objective cognitive decline, (3) having intact general cognitive function, MMSE score of 24 or lower, (4) having no clinical criteria for dementia, and (5) being independent in activities of daily living. Objective cognitive decline was defined as lower cognitive function in multiple domains more than 1.5 SD from the healthy database. Cognitive function in multiple domains was assessed using the National Center for Geriatrics and Gerontology–Functional Assessment Tool (NCGG-FAT). NCGG-FAT contains a battery of cognitive tests; the contents of the measurement have been described in detail in a previous study.[17] The battery consists of 8 tasks to assess memory, attention and execution, processing speed, and visuospatial skill. The term "cognitive healthy" in this study was defined as having cognitive ability intact, and not having objective cognitive impairment.

FoF/Fall Incidents

FoF was assessed at baseline and follow-up by a closed-ended question with 4 response choices about participants' general FoF. The question was phrased as follows: "Are you afraid of falling?" Participants who responded "very much" or "somewhat" were assigned to the fear group.[2] Participants who responded "a little" or "not at all" were assigned to the no-fear group. Participants who had reported FoF at follow-up were defined as the developed fear group, whereas those without FoF at both baseline and follow-up were defined as the never fear group. The participants also completed a standardized questionnaire, which recorded the number of times they had fallen during the 15-month follow-up period. A fall was defined as "an unexpected event in which the person comes to rest on the ground, floor, or lower level."[18] The question "Do you have any history of falling within the past year?" was used for detecting fallers. Participants who answered yes to the question were considered to be fallers.

Potential Confounding Factors With FoF

Demographic data were recorded, including age, gender, and educational history. Participants completed a questionnaire on medical condition, including total medications used. Participants were also asked about their use of walking aids in daily life.

Walking speed and the Timed Up and Go Test (TUG)[19] were used to assess physical performance. Walking speed was assessed at usual pace and expressed in meters per second. The TUG involves rising from a chair, walking 3 meters, turning around, walking back to the chair, and sitting down. Participants were instructed to complete the